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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/648,586	08/26/2003	Efren M. Lacap	408204	4089
30955	7590	05/23/2006		
LATHROP & GAGE LC 4845 PEARL EAST CIRCLE SUITE 300 BOULDER, CO 80301				
			EXAMINER JOHNSON, JONATHAN J	
			ART UNIT 1725	PAPER NUMBER

DATE MAILED: 05/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/648,586

Applicant(s)

LACAP ET AL.

Examiner

Jonathan Johnson

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1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 and 25-29 is/are pending in the application.
- 4a) Of the above claim(s) 12-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 and 25-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-17 and 25-29 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-11 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of US 6,372,622 (Tan). AAPA teaches forming a socket on a first surface of a microchip, such that the socket has predetermined physical dimensions complementary to those of a microchip connection pad footprint occupied by at least one contact pad area on the microchip (fig. 2, item 29), the socket presenting a conductive base capable of bonding to solder; forming a solder layer (figure 2, items 3a, 3b, 3c where the layer comprises discrete units of solder balls) in substantially continuous contact with the conductive base (where the solder is in continuous contact with the conductive base) to place a solder bar (where the examiner interprets the solder ball to be a thin solder bar) in the socket and place the microchip in made-ready condition for installation. (fig. 2, item 3a); wherein the microchip contains a silicon wafer and the step of forming the socket comprises depositing an adhesion layer onto the wafer, and depositing under-bump-metallization (UBM) material contacting the adhesion layer to complete formation of the conductive base (figure 2, items 4, 28 and 29); wherein the step of depositing the adhesion layer includes depositing a conductor selected from the group consisting of aluminum, nickel-vanadium, titanium, tungsten and copper

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(specification, paragraph 7); wherein the step of depositing the UMB material includes depositing a conductor selected from at least one of titanium, tungsten, vanadium, tin, copper, aluminum, gold, silver, and lead (specification, paragraph 8); wherein the step of forming the socket includes the predetermined dimensions selected from the group consisting of rectangular, "E," "L," and "U" shapes (figure 2, side profile of item 29); wherein the step of forming the socket includes the physical dimensions selected from the group consisting of ring, square, and circular shapes (figure 2, top view of item 20a); , wherein the step of forming the socket includes the physical dimensions being complimentary to the solder bar having a planar rectilinear configuration (figure 2, side view of 20A); wherein the step of forming the socket includes the physical dimensions being complimentary to the solder bar having a planar curvilinear configuration (figure 2, top view of 20a); wherein the step of forming the socket includes the physical dimensions being complimentary to the solder bar having a planar curvilinear configuration (figure 2, item 3a); wherein the step of forming the socket further comprising a step of forming a passivation layer on substantially all of the first surface, exclusive of an area where the socket is located (figure 2, item 29); wherein the step of forming the passivation layer includes the steps of: applying one or more layers of passivation material to the entire first surface; and removing selected portions of the passivation material covering the area where the socket is to be located (figure 2, item 29); wherein the step of applying one or more layers of passivation material includes applying at least one layer selected from the group consisting of polysilicon, silicon dioxide, and benzocyclobutane (figure 2, item 28); where the corresponding circuit connection comprises one of a PCB, another chip, and a ceramic interposer (figure 2, items 26 and 1). Tan teaches the interchangeability between a solder ball and a solder rectangle

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(col. 4, ll. 20-30) and where the solder bonds to copper (figure 4, item 30). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the shape of the solder to utilize a rectangle in order to form a reliable electrical connection (see Tan col. 1, ll. 5-55); and further to modify the combined invention to utilize copper as the UBM in order to effectively bond the solder to the substrate (see Tan col. 1, ll. 5-55).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA and Tan as applied to claim 1 above and further in view of US 6,977,396 (Shen). Shen teaches replacing older balls with a solder bar (col. 6, ll. 30-40). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the solder to utilize a solder bar in order to increase the area of interconnect (see Shen col. 6, ll. 30-45).

Claims 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA and Tan as applied to claim 1 above and further in view of US 2003/0157789 (Tong). Tong teaches the adhesion layer can be applied by electroplating and screen printing and the UBM can be applied by sputtering (paragraphs 7 and 32). It would have been obvious to one of ordinary skill

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in the art at the time of the invention to modify the layers to utilize the claimed deposition process in order to ensure the layers are adequately formed (see Tong col. 10-32).

Response to Arguments

Applicant's arguments with respect to claims 1-11 and 25-29 have been considered but are moot in view of the new ground(s) of rejection.

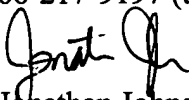
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Johnson whose telephone number is 571-272-1177.

The examiner can normally be reached on M-Th 7:30 AM-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jonathan Johnson
Primary Examiner
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